

Using 15 DHS surveys to study epidemiological correlates of TB courtesy stigma and health-seeking behaviour

E. J. J. Rood,* C. Mergenthaler,*† M. I. Bakker,* L. Redwood,† E. M. H. Mitchell†

*KIT Royal Tropical Institute, Amsterdam, †KNCV Tuberculosis Foundation, The Hague, The Netherlands

SUMMARY

SETTING: Tuberculosis (TB) stigma is thought to delay or prevent the decision to seek health care, but the strength of this association and the prevalence of anticipated TB stigma in the general population in most countries is unknown.

OBJECTIVE: To examine epidemiological, cultural and sociodemographic factors associated with TB courtesy stigma in 15 surveys across 13 countries, and its link to health seeking for cough in children under five.

DESIGN: A multilevel survey weighted logistic regression model was used to analyse how individual characteristics and social contexts affect the occurrence of TB courtesy stigma. The same modelling approach was used to analyse associations between TB courtesy stigma and individual-level predictors of health-seeking behaviour of mothers for children with cough.

RESULTS: TB courtesy stigma varies greatly among countries. TB courtesy stigma was negatively correlated

with knowledge of TB's curability (adjusted OR [aOR] 0.82; 95%CI 0.78–0.86) and human immunodeficiency virus (HIV) accepting attitudes (proxy for HIV stigma) (aOR 0.15, 95%CI 0.15–0.16). Mothers' health-seeking behaviour for children under five with cough was found to be positively correlated with HIV accepting attitudes (OR 1.16, 95%CI 1.08–1.25), but was marginally affected by TB courtesy stigma (OR 0.99, 95%CI 0.98–1.00).

CONCLUSION: Improving the general awareness of the effectiveness of anti-tuberculosis treatment will help to diminish TB courtesy stigma, and should be prioritised over expanding knowledge of mode of transmission. Efforts to reduce HIV and TB stigma may increase care seeking for childhood TB symptoms.

KEY WORDS: TB courtesy stigma; health-seeking behaviour; DHS; HIV stigma

TUBERCULOSIS (TB) STIGMA is often portrayed as a universal phenomenon. Similar to other types of stigma, it consists of labelling and stereotyping of traits and characteristics, thereby contributing to discrimination and isolation of individuals or groups.¹ This framing obscures wide variation among and within countries. (For detailed definitions of TB stigma types, refer to Macintyre et al. in this supplement.²) TB literature is filled with broad statements about TB stigma at community level, but few are grounded in cross-context standardised measurement because such tools do not exist or are not systematically employed in national household surveys.^{3–10} Much of what we think we know about TB stigma as a barrier to health-seeking behaviour comes from small samples of TB patient focus groups and interviews.^{11,12} These situated accounts of TB patients offer an important window in the lived experience of TB stigma. However, they are less useful for understanding how anticipated stigma, rooted in fear of exclusion, delays health seeking, or how social contexts or individual sociodemographic

characteristics inform the anticipated stigma of a TB diagnosis.

The detrimental effects of individual-enacted TB stigma (i.e., stigma that is carried out) on anti-tuberculosis treatment and delay in health-seeking behaviours have been shown in various settings.^{12–16} For example, fear of social exclusion is thought to inhibit people from initiating a TB diagnostic process when they experience TB symptoms.¹⁷ The true prevalence of anticipated TB stigma globally and its role in delaying health-seeking behaviour, however, are unclear.¹² It is necessary to generate this evidence to understand its scope, geographic distribution and public health implications. This measurement gap limits our ability to appropriately channel resources to countries with the highest burden, where anticipated TB stigma could have a large impact on the TB epidemic.

It is widely assumed that TB stigma in the general population is related to individual-level factors, including sex, age, religion or education (Figure 1); however, it remains unclear as to how or to what

Correspondence to: Ente Rood, KIT Health, The Royal Tropical Institute, Mauritskade 63, 1092 AD Amsterdam, The Netherlands. e-mail: e.rood@kit.nl

Article submitted 9 December 2016. Final version accepted 30 July 2017.

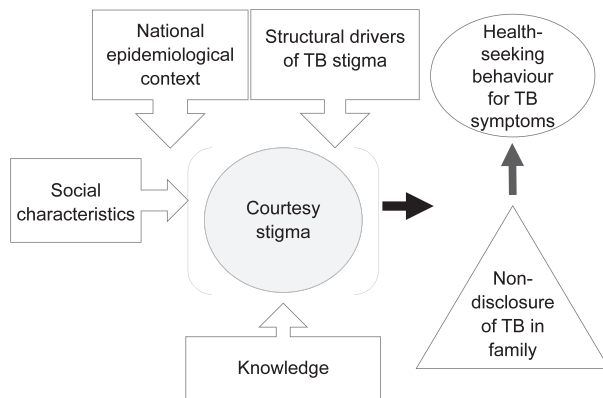


Figure 1 Conceptual framework outlining the individual, social, demographic and epidemiological drivers of TB stigma and the causal pathway towards deterred health seeking behaviour, which formed the analysis and results presented in this study. TB = tuberculosis; HIV = human immunodeficiency virus; MDR-TB = multidrug-resistant TB.

degree. Perceived contagiousness has been reported as a key determinant of TB stigma by various authors,¹² and accurate knowledge of the route of TB transmission has been correlated with increased fear and social distance resulting from TB stigma.^{6,8,18}

Social and epidemiological factors are also expected to influence TB stigma prevalence. For example, alcohol use disorder (AUD) and injection drug use (IDU) often co-occur with TB,^{19,20} and together with homelessness are considered to have a synergistic relationship fostering social exclusion.¹⁹ National incarceration policies and rates have also been shown to amplify TB, and can therefore be considered potential structural drivers of TB stigma.^{21,22}

HIV stigma is hypothesised to influence TB stigma in TB-HIV syndemic settings because of the fear that an HIV diagnosis may follow a TB diagnosis, leading to self-directed internalised or enacted HIV stigma.^{5,9,23,24} Describing the influence of HIV stigma upon TB health-seeking behaviour on a cross-cultural level can inform intervention design and whether such interventions should be approached collectively.

The present study was designed to explore socio-demographic and cultural individual-level, as well as epidemiological national-level, correlates of courtesy stigma of TB measured in general population surveys, and to assess whether TB courtesy stigma would affect a mother's decision to seek health care when her child presents with TB-associated symptoms. Courtesy stigma is defined as carry-over stigma experienced due to connection (e.g., familial ties) with a stigmatised person.²⁵ TB courtesy stigma has been regularly included in Demographic and Health Surveys (DHS) and is used as a surrogate measure for anticipated TB stigma based on the logic that an individual will keep a family member's illness secret to protect the family member (or him/herself) from TB-related stigma. Although anticipated TB stigma is

not measured in large DHS, one item about hypothetical TB courtesy stigma is asked in 67 DHS. Courtesy stigma has been shown to co-occur and covary with anticipated stigma, and was therefore selected as a surrogate in this analysis.^{26,27}

METHODOLOGY

Data management

For this analysis, cross-sectional and retrospective data collected in nationwide DHS were used.²⁸ As each country-specific DHS survey protocol has been reviewed by the ICF International Institutional Review Board (IRB), additional ethical clearance was not needed for these secondary analyses of anonymised DHS data. Individual-level data were extracted from 15 nationally representative DHS conducted in four Asian, one European and eight African countries between 2005 and 2014. Data from all surveys were pooled into a single database, stratified and weighed using the weighting scheme for stratified clustered sample designs provided with the DHS data.²⁹ To account for between-country differences in population size, weights were normalised proportional to the mid-year female population aged 15–49 years of each country during the survey year. Population statistics were derived from the United Nations Economic and Social Council Population Division.³⁰

As validated scales measuring anticipated TB stigma have been developed,³¹ but not yet incorporated into large household surveys, TB courtesy stigma was quantified using the standard question included in DHS IV and V surveys: 'If a member of your family got TB, would you want it to remain a secret or not?'. The primary outcome used in this study is the proportion of respondents who had heard of TB and who would not want to disclose the TB status of a family member (non-responders excluded).

An extensive set of epidemiological factors as well as individual-level cultural and sociodemographic factors that could affect TB courtesy stigma were considered in this study. Individual-level factors were derived from DHS data sets: sex, wealth quintile, education level, religion, age class, knowledge of the airborne route of TB transmission (yes/no), knowledge of curability of TB (yes/no) and having an accepting attitude towards people living with HIV (yes/no). Thirty-two national-level factors were derived from the Global Health Repository³² and the World Health Organization global TB burden database.³³ To prevent multicollinearity of variables from biasing the results of the analysis, five national-level factors were included in the final analysis: TB incidence (per 1000 population), HIV prevalence (%), AUD (%), incarceration rate (per 1000 population), and proportion of respondents knowledgeable about TB transmission (%). For a detailed description

of data collection processing and variable selection, see Appendix.*

Health care-seeking behaviour

As stigma is potentially an important factor affecting a person's health-seeking behaviour, we assessed the correlation between TB courtesy stigma and health care seeking for child cough. DHS questions on health care-seeking behaviour of mothers whose children under the age of five coughed ('Has [NAME] had an illness with a cough at any time in the last 2 weeks?') were used. These were recorded as a dichotomous variable in which mothers who indicated having sought health care at any type of health care facility ('Did you seek advice or treatment for the illness from any source?') for any of her children aged <5 years with cough during the last 2 weeks were scored as 'yes' and respondents not seeking health care for any of their children under five with cough within the last 2 weeks were scored as 'no'.

Statistical analysis

The effects of covariate factors on TB courtesy stigma were tested by fitting multilevel logistic regression models using a sampling-weighted least squared method to the data,³⁴ accounting for the complex clustered sampling design used in the DHS. To account for within-survey and within-enumeration area clustering, a survey design was used and weighted according to the inverse of the population sampling fractions.

To assess the association between each covariate factor and TB courtesy stigma, univariate models were fit to the data and crude odds ratios (ORs) were determined for each variable. Adjusted ORs correcting for confounding and possible association between individual predictor variables were calculated by fitting a multivariate model, including all covariates, to the data. The same modelling approach was used to identify individual determinants of health-seeking behaviour of mothers for children with cough. National level covariates were not included in this analysis.

RESULTS

Collating data derived from 15 DHS resulted in a database containing 543 746 records. Excluding non-responses resulted in 413 966 (76%) individuals who answered the attitudinal question on TB non-disclosure. Analysis of the factors associated with non-response showed that no relation existed between factors associated with non-response and TB courtesy stigma.

Forty-one per cent of all respondents ($n = 171\,119$) were from the 2006 DHS V conducted in India, were predominantly female in all countries (65.9%) and strictly female in Tajikistan, Cambodia and Tanzania (62.6% without Cambodia, Tajikistan and Tanzania) (Table 1). The weighted average of TB courtesy stigma (i.e., non-disclosure of familial TB) globally was 25.6% (95% confidence interval [CI] 24.9–26.3) and highly variable between surveys (interquartile range 19–32%) (Figure 2).

The results of univariate models show highly significant associations between the TB courtesy stigma covariates tested (Table 2). TB courtesy stigma is positively correlated with Christian faith or lack of religious affiliation. It is surprising to note that TB courtesy stigma was also positively correlated with knowledge of TB transmission on national and individual levels. Conversely, TB courtesy stigma is negatively correlated with a person's knowledge of TB curability and increasing age class. Accepting attitudes towards people living with HIV are highly negatively correlated to TB courtesy stigma.

Multivariate adjustment of ORs revealed no relation between education level and TB courtesy stigma. However, increasing age and lower wealth quintiles were still found to be significantly related to reduced TB courtesy stigma. Having an accepting attitude towards people living with HIV resulted in a reduction of the odds of TB courtesy stigma by 85% (aOR 0.15, 95%CI 0.15–0.16). Likewise, being knowledgeable of the fact that TB can be cured reduced the odds by 18% (aOR 0.82, 95%CI 0.78–0.86). Having knowledge of the airborne route of TB transmission, however, was no longer significantly related with TB courtesy stigma (aOR 1.04, 95%CI 1.00–1.09), while at the national level a 1% increase in knowledge was still found to increase courtesy stigma by 2% (aOR 1.02, 95%CI 1.01–1.02). Moreover, at national level, a 1% increase in HIV prevalence increased the odds of TB courtesy stigma by 7% (aOR 1.07, 95%CI 1.05–1.09). Likewise a 1/1000 increase in the prevalence of AUD increased stigma by 16% (aOR 1.16, 95%CI 1.12–1.20), a 1/1000 increase in incarceration rates increased stigma by 25%, and a 1/1000 increase in TB incidence reduced stigma by 7% (aOR 0.93, 95%CI 0.90–0.97).

Health-seeking behaviour

To assess the effect of TB non-disclosure and other covariate factors on a mother's decision to seek health care, 117 630 mothers with a child aged <5 years from 13 different surveys in 11 countries were included in the analysis. Across all surveys, 26 729 (22.7%) mothers reported having a child with a cough in the 2 weeks before the survey. Of all mothers reporting a child with a cough, 17 013 (63.0%) sought health care for at least one child

* The appendix is available in the online version of this article, at <http://www.ingentaconnect.com/content/iuatld/ijtd/2017/00000021/a00111s1/art00010>

Table 1 Population description of data used to identify determinants of TB courtesy stigma*

	Ethiopia %	Ethiopia %	India %	Kenya %	Cambodia %	Kyrgyz Republic %	Malawi %	Nigeria %	Namibia %	Namibia %	Tanzania %	Ukraine %	Zambia %	Zimbabwe %
Start of survey	2005	2011	2006	2008	2005	2012	2010	2008	2007	2013	2012	2007	2013	2005
Sex														
Male	32	48	39	29	0	23	24	36	28	30	0	31	48	45
Female	68	52	61	71	100	77	76	64	72	70	100	69	52	55
Education														
No education	46	39	22	12	20	0	12	27	8	8	1	0	6	3
Primary	26	42	14	52	55	0	66	21	28	24	2	0	43	30
Secondary	23	11	51	27	24	58	20	39	58	61	74	45	44	63
Higher	4	8	14	9	1	42	2	13	6	7	23	54	7	4
Age class, years														
15–19	22	22	19	21	21	17	22	16	22	20	15	12	23	25
20–24	19	18	18	20	18	18	19	18	19	19	18	14	18	21
25–29	17	19	17	16	13	16	18	19	16	16	16	15	16	16
30–34	13	13	14	14	12	13	14	15	15	13	13	15	15	14
35–39	12	12	13	11	13	12	11	13	11	12	13	12	12	10
40–44	9	9	11	9	12	12	8	10	10	10	13	14	10	7
45–49	8	7	8	8	10	11	7	9	7	8	11	16	7	7
Religion														
Buddhist	0	0	2	0	100	NA	0	0	0	0	0	0	0	0
Christian	63	54	9	82	0	NA	88	57	99	97	0	84	99	79
Hindu	0	0	73	0	0	NA	0	0	0	0	0	0	0	0
Muslim	36	45	13	15	0	NA	11	42	0	0	100	2	1	1
Traditional	1	1	0	0	0	NA	0	1	0	0	0	0	0	5
No religion	0	0	0	3	0	NA	1	0	1	3	0	14	0	16
Other	0	0	3	0	0	NA	0	0	0	0	0	0	0	0
Wealth														
Q1	15	20	9	19	18	22	19	17	16	16	16	15	16	17
Q2	13	14	13	16	20	21	20	18	17	19	16	17	19	18
Q3	13	14	19	17	19	20	21	20	24	21	17	20	21	18
Q4	14	16	26	20	19	19	21	22	25	24	21	19	22	23
Q5	44	35	34	28	24	19	21	23	18	21	30	27	22	23
Knowledge about TB curability	81	84	83	90	85	80	80	75	93	85	85	81	77	87
Knowledge about TB transmission	71	60	57	76	66	84	78	64	76	77	78	53	69	69
Not disclosing TB status	22	22	16	20	15	30	47	19	16	29	27	71	42	63
Accepting attitude towards PLHIV	23	25	38	35	37	4	23	18	39	26	7	32	21	15
Respondents answering TB disclosure question, <i>n</i>	15 197	28 013	171 119	11 470	15 371	9 360	28 959	34 192	12 943	13 283	6 210	7 810	30 148	14 923
Mid-period population (>1 000)	76 608	89 859	1 162 088	38 757	49 240	5 648	17 215	151 116	2 083	2 347	7 931	46 249	15 484	13 056

* Population numbers are based on the total mid-year population of the country at the time of the survey.
 TB = tuberculosis; PLHIV = people living with the human immunodeficiency virus.

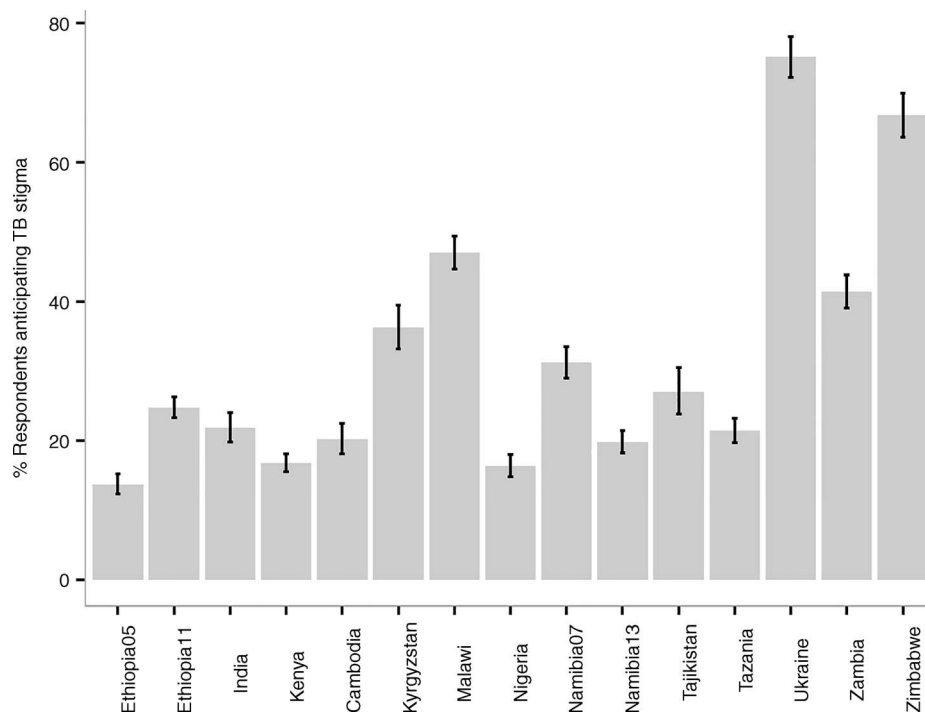


Figure 2 Percentage of respondents' indication to keep it a secret if a family member has TB, stratified by survey. Error bars indicate 95% confidence intervals around the observed percentage. TB = tuberculosis.

with cough, 20.5% of whom would not disclose TB. Among mothers who did not seek health care, this proportion was 21.7%. Both univariate and multivariate analysis showed a very modest, but significant, reduction in health-seeking behaviour among mothers who preferred secrecy in cases of familial TB. As expected, the mothers' health-seeking behaviour increased with increasing wealth (Q5, OR 1.89, 95%CI 1.27–2.79), education (higher level, OR 1.27, 95%CI 1.06–1.52) and accepting attitudes towards people with HIV (OR 1.16, 95%CI 1.08–1.25) (Table 3).

DISCUSSION

Our study shows that TB courtesy stigma varied greatly both within and between the 15 DHS surveys conducted across 13 countries. TB courtesy stigma was associated with both cultural and sociodemographic factors acting on the individual as well the epidemiological context.

Increased awareness of the airborne mode of TB transmission was found to be associated with TB courtesy stigma. However, this association is counterbalanced once attitudes towards HIV and knowledge of TB curability are accounted for. While knowledge of TB transmission could lead to increased TB stigma, knowledge of TB curability reduced the perceived desire to keep TB a secret. Fear of transmission of the disease is expected to trigger

social distancing,³⁵ while knowledge of TB's curability lessens the desire for secrecy, opening a window for public health interventions to prioritise messages about TB's curability.

Various authors have described how TB can be perceived as a marker for HIV, thereby influencing an individual's perception of TB and TB stigma, and potentially altering their behaviour towards people with TB.^{7,12} The status of the HIV epidemic is expected to influence a person's attitude and potential stigmatising behaviour towards persons with TB.³ Our analyses are in line with this expectation, as HIV-accepting attitudes (lower HIV stigma) were found to reduce TB courtesy stigma, while increasing HIV prevalence was associated with higher rates of TB courtesy stigma. This relationship, while somewhat weaker, was also found in areas with lower HIV prevalence. This raises questions about causal mechanisms leading a person not to disclose the TB status of a family member. In cases where HIV remains a major public health issue, TB disease is often conflated with HIV infection,^{3,9,31} leading to TB stigma and delayed health-seeking behaviour of people with TB symptoms.

In contrast to our findings, Somma et al. reported greater stigma in India than in Malawi;³⁶ however, this finding came from a population composed exclusively of TB patients, while the results presented here are based on responses from a population-based survey.

Table 2 Univariate and multivariate effects of factors on an individual's response to keep it a secret if a family member is found to be affected with TB

	Univariate				Multivariate			
	OR (95%CI)	T	Wald (χ^2)	P value	OR (95%CI)	T	Wald (χ^2)	P value
Individual covariates								
Female sex	1.00 (1.00–1.00)	0.00	62	<0.0001	1.04 (0.99–1.09)	1.40	2	0.160
Wealth	1.00		31.2	<0.0001	1.00		23.8	<0.0001
Q1	1.08 (1.02–1.14)	2.69			1.09 (1.02–1.16)	2.56		
Q2	1.11 (1.05–1.18)	3.56			1.17 (1.09–1.25)	4.31		
Q3	1.05 (0.99–1.12)	1.65			1.19 (1.10–1.28)	4.51		
Q4	0.95 (0.89–1.02)	–1.34			1.18 (1.09–1.27)	3.96		
Q5								
Education	1.00		92.6	<0.0001	1.00		14.8	0.0051
No education	1.14 (1.09–1.19)	5.82			0.95 (0.89–1.00)	–1.91		
Primary	1.02 (0.97–1.07)	0.89			0.96 (0.90–1.02)	–1.31		
Secondary	1.28 (1.19–1.37)	6.55			1.00 (0.92–1.09)	0.09		
Higher	0.32 (0.06–1.78)	–1.30			0.11 (0.03–0.49)	–2.91		
No response								
Religion	1.00		1224	<0.0001	1.00		126.2	<0.0001
Buddhist	2.77 (2.49–3.07)	19.31			1.81 (1.46–2.23)	5.48		
Christian	1.31 (1.18–1.45)	4.98			2.18 (1.78–2.66)	7.65		
Hindu	1.53 (1.37–1.71)	7.49			1.94 (1.57–2.40)	6.11		
Muslim	2.22 (1.75–2.82)	6.53			2.05 (1.52–2.77)	4.72		
Traditional	14.85 (11.93–18.49)	24.15			3.10 (2.40–4.01)	8.64		
No religion	1.00 (0.83–1.19)	–0.04			1.64 (1.28–2.11)	3.86		
Other								
Age class, years	1.00		102.1	<0.0001	1.00		168.5	<0.0001
15–19	0.94 (0.90–0.97)	–3.35			0.92 (0.88–0.97)	–3.46		
20–24	0.88 (0.85–0.92)	–6.16			0.87 (0.83–0.91)	–5.75		
25–29	0.88 (0.84–0.91)	–6.30			0.83 (0.79–0.87)	–7.20		
30–34	0.84 (0.81–0.88)	–7.56			0.77 (0.73–0.81)	–9.39		
35–39	0.83 (0.79–0.87)	–7.83			0.76 (0.71–0.80)	–9.40		
40–44	0.87 (0.83–0.92)	–5.31			0.73 (0.68–0.77)	–10.02		
45–49	0.83 (0.80–0.86)	–9.53	23.2	<0.0001	0.82 (0.78–0.86)	–8.09	65.4	<0.0001
Knowledge about TB curability (yes vs. no)	1.21 (1.17–1.26)	9.91	98.2	<0.0001	1.04 (1.00–1.09)	1.93	3.7	0.0540
Knowledge about TB transmission (yes vs. no)	0.14 (0.14–0.15)	–75.40	5689.7	<0.0001	0.15 (0.15–0.16)	–67.46	4550.5	<0.0001
HIV accepting attitude (yes vs. no)								
National covariates			32.2	<0.0001	0.931 (0.90–0.97)	–3.61	13.1	0.0003
TB incidence, /1000 population	0.91 (0.88–0.94)	–5.67	<0.0001	1.069	1.069 (1.05–1.09)	7.31	53.5	<0.0001
HIV prevalence, %	1.14 (1.13–1.15)	1194.1	1343.2	<0.0001	1.157 (1.12–1.20)	8.41	70.8	<0.0001
Alcohol use disorder, %	1.28 (1.26–1.30)	36.60	1743.7	<0.0001	1.254 (1.14–1.38)	4.73	22.4	<0.0001
Incarceration rate, /1000 population	2.31 (2.23–2.41)	41.60	1831.1	<0.0001	1.017 (1.01–1.02)	7.17	51.5	<0.0001
Knowledge about TB transmission, %	1.05 (1.05–1.05)	42.80						

TB = tuberculosis; OR = odds ratio; CI = confidence interval; HIV = human immunodeficiency virus.

Table 3 Univariate and multivariate effects of covariate factors on mothers with ≥ 1 children aged <5 years reporting a cough during the last 2 weeks to seek health care

	Univariate			Multivariate		
	OR (95%CI)	T	P value	OR (95%CI)	T	P value
TB non-disclosure	0.98 (0.97–0.99)	–4.0	0.002	0.99 (0.98–1.00)	–2.8	0.019
HIV accepting attitude	1.43 (1.30–1.58)	8.0	<0.001	1.16 (1.08–1.25)	4.7	0.001
Wealth						
Q1	1.00		<0.001	1.00		<0.001
Q2	1.19 (1.08–1.31)	4.0	0.002	1.16 (1.03–1.31)	2.8	0.020
Q3	1.44 (1.30–1.61)	7.5	<0.001	1.34 (1.18–1.54)	4.9	0.001
Q4	1.81 (1.48–2.22)	6.5	<0.001	1.59 (1.22–2.07)	4.0	0.003
Q5	2.40 (1.73–3.32)	5.8	<0.001	1.89 (1.27–2.79)	3.6	0.005
Education						
No education	1.00		<0.001	1.00		<0.001
Primary	1.22 (0.98–1.52)	2.0	0.071	1.05 (0.83–1.34)	0.5	0.651
Secondary	1.69 (1.48–1.93)	8.6	<0.001	1.21 (1.02–1.43)	2.5	0.033
Higher	2.07 (1.78–2.41)	10.4	<0.001	1.27 (1.06–1.52)	3.0	0.015
Religion						
Hindu	1.00		<0.001	1.00		<0.001
Muslim	1.39 (1.28–1.50)	9.1	<0.001	1.47 (1.36–1.59)	10.9	<0.001
Christian	1.22 (0.95–1.57)	1.8	0.105	1.11 (0.89–1.39)	1.0	0.331
Sikh	4.26 (4.19–4.33)	199.1	<0.001	2.94 (2.51–3.43)	15.4	<0.001
Buddhist	1.79 (1.04–3.07)	2.4	0.037	1.62 (0.85–3.06)	1.7	0.124
Jain	0.95 (0.62–1.45)	–0.3	0.780	0.67 (0.30–1.48)	–1.1	0.283
Traditional	0.84 (0.44–1.59)	–0.6	0.549	1.03 (0.53–1.99)	0.1	0.931
No religion	0.76 (0.45–1.28)	–1.2	0.266	1.12 (0.91–1.37)	1.2	0.243
Other	0.51 (0.00–0.72)	–4.4	0.001	0.59 (0.43–0.82)	–3.6	0.005
No response	0.47 (0.40–0.55)	–10.7	<0.001	0.56 (0.47–0.67)	–7.5	<0.001
Age class, years						
15–19	1.00		<0.001	1.00		<0.001
20–24	1.10 (1.03–1.17)	3.3	0.006	1.06 (0.98–1.14)	1.7	0.128
25–29	1.10 (1.03–1.18)	3.1	0.010	1.05 (0.94–1.18)	0.9	0.372
30–34	1.07 (0.98–1.17)	1.6	0.126	1.02 (0.87–1.20)	0.3	0.784
35–39	0.81 (0.69–0.95)	–3.0	0.012	0.77 (0.70–0.85)	–6.3	<0.001
40–44	0.96 (0.76–1.22)	–0.3	0.738	1.01 (0.79–1.31)	0.1	0.900
45–49	0.58 (0.42–0.80)	–3.6	0.003	0.61 (0.51–0.73)	–6.1	<0.001

OR = odds ratio; CI = confidence interval; TB = tuberculosis; HIV = human immunodeficiency virus.

The health-seeking behaviour of mothers in case of a child with cough was strongly associated with HIV-accepting attitudes (e.g., low HIV stigma was associated with a higher likelihood of care seeking). Health-seeking behaviour, however, was not strongly related to TB courtesy stigma, although it is important to emphasise that not all mothers will consider cough to be a symptom of TB, as it is often not. HIV acceptance and stigma are therefore expected to play a greater role in the emergence of TB stigma, and ultimately in health care-seeking behaviour. High HIV prevalence and HIV stigma have been hypothesised as causes of TB health-seeking delay due to fear of learning one's HIV status,^{13,23} and the subsequent social distancing by others.^{14,15} While TB knowledge and preference for secrecy of family TB status influence health care-seeking behaviour,¹⁴ the results presented here show that, cross-culturally, fostering HIV-accepting attitudes (low HIV stigma) may be of greater importance in spurring the detection of childhood TB.

Limitations

It could be argued that a person's decision not to disclose the TB status of a family member is not

necessarily indicative of courtesy TB stigma, but can also be influenced by factors other than TB. Social dependencies and commitment towards family members are likely to play a role in supportive attitudes towards family members who contract TB. The decision not to disclose TB status can reflect discretion not to interfere with a person's social status. In addition to altruistic motivations, social attribution, which attaches stigma to those who are merely associated with a stigmatised person, often plays a key role in a person's decision to disclose the TB status of a family member.³⁰ Nevertheless, while this question is not a perfect measure of TB stigma, but rather a consequence of TB stigma, it provided an unparalleled opportunity to perform hypothesis generation. This, as mentioned earlier,^{10–14} has been shown to delay health-seeking behavior, underscoring the relevance of planning social interventions for TB prevention and control.

All DHS surveys that were published within 10 years of study commencement and included questions on TB were included in this study. Although the included surveys span 10 years, it was assumed that no significant paradigm shifts have occurred in drivers of stigma during this period. Therefore, while shifting determinants may have led to different stigma

outcomes within countries over time, it is unlikely that this wide window of inclusion would significantly influence the global results and conclusions.

Pooling multiple surveys comes at the risk of over-generalising findings across sociocultural settings. Results should be interpreted with care, with the insight that these relationships are rooted in other country-specific social factors. Significant associations should not be interpreted as evidence of causality, but rather as indicative of the importance of contextual differences across social and cultural groups or gradients, which require further research to reveal context-specific causal pathways.

CONCLUSIONS AND RECOMMENDATIONS

The results of this analysis suggest that the perceived need for secrecy about familial TB is higher in countries with higher AUD, higher HIV prevalence and higher incarceration rates, but lower in countries with higher TB incidence. Keeping TB in the family a secret is a greater concern for the wealthy and the young, neither of which tend to have high TB burdens. Fortunately, TB stigma does not appear to have a major impact on health care-seeking for cough in young children.

HIV stigma, however, is associated with both TB stigma and poor health seeking for child cough across a diverse sociocultural and economic landscape. Reducing TB stigma may be best approached through a joint TB and HIV stigma reduction campaign, emphasising TB's curability in combination with context-specific messages about HIV stigma reduction.

TB and HIV funding mechanisms should invest in national and international public health initiatives measuring the effectiveness of such an intervention while testing assumed social drivers of health-seeking behaviour. However, without the input of population representative evidence on individual and national drivers of health-seeking behaviour, policy and standard practices on this subject will remain uninformed. DHS, multi-indicator cluster surveys and TB prevalence surveys are well suited to including validated TB stigma scales, thereby strengthening our policies on stigma reduction, and motivating positive health-seeking behaviours.

Acknowledgements

The Global Health Bureau, Office of Health, Infectious Disease and Nutrition (HIDN), US Agency for International Development (USAID, Washington DC, USA), financially supports this study through Challenge TB under the terms of Agreement No. AID-OAA-A-14-00029. The analyses were improved by the valuable and constructive inputs from The TB Stigma Measurement and Reduction Group (TSMRG) members convened as part of the

USAID supported TB stigma measurement meeting in 2015, as well as S van den Hof.

The authors' views expressed in this publication do not necessarily reflect the views of USAID or the US Government.

Conflicts of interest: none declared.

References

- 1 Hatzenbuehler M L, Phelan J C, Link B G. Stigma as a fundamental cause of population health inequalities. *Am J Public Health* 2013; 103: 813–821.
- 2 Macintyre K, Bakker M I, Bergson S, et al. Defining the research agenda to measure and reduce TB stigma. *Int J Tuberc Lung Dis* 2017; 21 (Suppl 1): S87–S96.
- 3 Mavhu W, Dauya E, Bandason T, et al. Chronic cough and its association with TB-HIV co-infection: factors affecting help-seeking behaviour in Harare, Zimbabwe. *Trop Med Int Health* 2010; 15: 574–579.
- 4 Cramm J M, Finkenflügel H J M, Møller V, Nieboer A P. TB treatment initiation and adherence in a South African community influenced more by perceptions than by knowledge of tuberculosis. *BMC Public Health* 2010; 10: 72.
- 5 Bond V, Nyblade L. The importance of addressing the unfolding TB-HIV stigma in high HIV prevalence settings. *J Community Appl Soc Psychol* 2006; 16: 452–461.
- 6 Jittimanee S X, Nateniyom S, Kittikraisak W, et al. Social stigma and knowledge of tuberculosis and HIV among patients with both diseases in Thailand. *PLOS ONE* 2009; 4: e6360.
- 7 Baral S C, Karki D K, Newell J N, et al. Causes of stigma and discrimination associated with tuberculosis in Nepal: a qualitative study. *BMC Public Health* 2007; 7: 211.
- 8 Sengupta S, Pongrassami P, Balhip Q, et al. Social impact of tuberculosis in southern Thailand: views from patients, care providers and the community. *Int J Tuberc Lung Dis* 2006; 10: 1008–1012.
- 9 Møller V, Erstad I. Stigma associated with tuberculosis in a time of HIV/ AIDS: Narratives from the Eastern Cape, South Africa. *S Afr Rev Sociol* 2007; 38: 103–119.
- 10 Macq J, Solis A, Martinez G. Assessing the stigma of tuberculosis. *Psychol Health Med* 2006; 11: 346–352.
- 11 Munro S A, Lewin S A, Smith H J, Engel M E, Fretheim A, Volmink J. Patient adherence to tuberculosis treatment: a systematic review of qualitative research. *PLOS Med* 2007; 4: 1230–1245.
- 12 Courtwright A, Turner A N. Tuberculosis and stigmatization: pathways and interventions. *Public Health Rep* 2010; 125 (Suppl 4): S34–S42.
- 13 Møller V, Erstad I, Cramm J M, et al. Delays in presenting for tuberculosis treatment associated with fear of learning one is HIV-positive. *Afr J AIDS Res* 2011; 10: 25–36.
- 14 Storla D G, Yimer S, Bjune G A. A systematic review of delay in the diagnosis and treatment of tuberculosis. *BMC Public Health* 2008; 8: 15.
- 15 Finnie R K C, Khoza L B, van den Borne B, Mabunda T, Abotchie P, Mullen P D. Factors associated with patient and health care system delay in diagnosis and treatment for TB in sub-Saharan African countries with high burdens of TB and HIV. *Trop Med Int Health* 2011; 16: 394–411.
- 16 Macq J, Solis A, Martinez G, Martiny P, Dujardin B. An exploration of the social stigma of tuberculosis in five 'municipios' of Nicaragua to reflect on local interventions. *Health Policy* 2005; 74: 205–217.
- 17 Juniarti N, Evans D. A qualitative review: the stigma of tuberculosis. *J Clin Nurs* 2011; 20: 1961–1970.
- 18 West E L, Gadkowski L B, Ostbye T, Piedrahita C, Stout J E. Tuberculosis knowledge, attitudes, and beliefs among North Carolinians at increased risk of infection. *N C Med J* 2008; 69: 14–20.

- 19 Rehm J, Samokhvalov A V, Neuman M G, et al. The association between alcohol use, alcohol use disorders and tuberculosis (TB). A systematic review. *BMC Public Health* 2009; 9: 450.
- 20 Deiss R G, Rodwell T C, Garfein R S. Tuberculosis and illicit drug use: review and update. *Clin Infect Dis* 2009; 48: 545–550.
- 21 Stuckler D, Basu S, McKee M, King L. Mass incarceration can explain population increases in TB and multidrug-resistant TB in European and central Asian countries. *Proc Natl Acad Sci USA* 2008; 105: 13280–13285.
- 22 Basu S, Stuckler D, McKee M. Addressing institutional amplifiers in the dynamics and control of tuberculosis epidemics. *Am J Trop Med Hyg* 2011; 84: 30–37.
- 23 Ngamvithayapong J, Winkvist a, Diwan V. High AIDS awareness may cause tuberculosis patient delay: results from an HIV epidemic area, Thailand. *AIDS* 2000; 14: 1413–1419.
- 24 Daftary A. HIV and tuberculosis: the construction and management of double stigma. *Soc Sci Med* 2012; 74: 1512–1519.
- 25 Pescosolido B A. The stigma complex. *Annu Rev Sociol* 2015; 41: 87–116.
- 26 Arcêncio R A, de Almeida Crispim J, Touso M M, et al. Preliminary validation of an instrument to assess social support and tuberculosis stigma in patients' families. *Public Heal Action* 2014; 4: 195–200.
- 27 Mall S, Middelkoop K, Mark D, Wood R, Bekker L-G. Changing patterns in HIV/AIDS stigma and uptake of voluntary counselling and testing services: The results of two consecutive community surveys conducted in the Western Cape, South Africa. *AIDS Care* 2013; 25: 194–201.
- 28 The DHS Program. Survey Search. Rockville, MD, USA: ICF, <http://dhsprogram.com/What-We-Do/survey-search.cfm?pgtype=main&SrvyTp=country> Accessed October 2015.
- 29 US Agency for International Development. Demographic and health surveys methodology. Washington DC, USA: USAID, 2006.
- 30 Department of Economic and Social Affairs, United Nations Population Division. International migration. New York, NY, USA: UN 2015.
- 31 Van Rie A, Sengupta S, Pungrassami P, et al. Measuring stigma associated with tuberculosis and HIV/AIDS in southern Thailand: exploratory and confirmatory factor analyses of two new scales. *Trop Med Int Health* 2008; 13: 21–30.
- 32 World Health Organization. Global Health Observatory data repository. Geneva, Switzerland: WHO, 2016.
- 33 World Health Organization. TB data. Geneva, Switzerland: WHO, 2016. <http://www.who.int/tb/country/en/> Accessed August 2017.
- 34 Lumley T. Analysis of complex survey samples. *J Stat Softw* 2004; 9: 1–19.
- 35 Jaramillo E. Tuberculosis and stigma: predictors of prejudice against people with tuberculosis. *J Health Psychol* 1999; 4: 71–79.
- 36 Somma D, Thomas B E, Karim F, et al. Gender and socio-cultural determinants of TB-related stigma in Bangladesh, India, Malawi and Colombia. *Int J Tuberc Lung Dis* 2008; 12: 856–866.

APPENDIX

Data collection and variable selection for multilevel modelling

To model the effect of individual- and national-level determinants on a person's reported willingness to disclose the tuberculosis (TB) status of a family member, data on national-level socio-economic conditions and epidemiological context were extracted from various sources and collated into a single data set. Individual drivers, including a person's sex (male, female), age class, highest education completed, religion and wealth status, as well as a person's knowledge of TB transmission (yes/no) and curability (yes/no) were derived from the Demographic Health Survey (DHS) data. Religious groups which were underrepresented in the database, including Sikh ($n = 3782$), Jain ($n = 872$), Jewish ($n = 25$), Parsi ($n = 6$) and other ($n = 1783$) were merged into a single category called 'other'. Individuals who did not report their highest education ($n = 172$) and people for whom education level was not recorded ($n = 34$) were excluded.

To assess whether courtesy TB stigma was affected by a person's attitude towards human immunodeficiency virus (HIV) (accepting vs. non-accepting), an indicator composed of HIV attitudes as described in the DHS manual was used. Negative responses to these questions were inferred to be indicative of HIV stigma, resulting from social judgment of people living with HIV/acquired immune-deficiency syndrome (PLWHA) or concerns about casual transmission.

The effect of public perceptions and social conditions at the national level, including rates of alcohol use disorder (AUD), incarceration, prevalence of multidrug-resistant TB (MDR-TB) and prevalence of drug use disorder were derived from the World Health Organization (WHO) Global Health Observatory repository.¹ Alcohol abuse was defined as the proportion of adults (age >15 years) with AUD during the past 12 months. AUDs were defined as harmful use of alcohol (International Classification of Diseases, Tenth Revision [ICD-10] F10.1) or alcohol dependence (ICD-10 F10.2).

To test whether public perceptions and attitudes towards TB and HIV affect courtesy stigma experienced by an individual, nationally aggregated rates of these indicators were calculated from the DHS data and merged with individual-level data. The 2012 prevalence of HIV among adults aged 15–49 years and the percentage of population in that age group were also obtained from the WHO Global Health Observatory repository and appended to the database. Global national estimates of TB incidence were downloaded from the WHO TB database (accessed after the Global tuberculosis report 2016 was published²) for the year of the

Table A.1 Correlations of individual variables with the first two factors of the multiple factor analysis model. The percentage variance explained by each of the two factors with an eigenvalue of >1 is indicated for each factor

	Factor 1 (26%)	Factor 2 (21%)
Q18		−0.5304
Q20		0.5462
Q21		
Q22	0.6492	
Q24	0.6762*	
Q25		
Q26		
Q27		
Q28	0.5628	0.579
Q29		0.6814
Q30	0.5971	
Q31		0.6417
Q32		0.7417*
Q33		0.5738
Q35		0.7465*
Q37	0.66	
Q39	0.5488	
Q42		
Q51		
Q60		−0.6084
Q61		−0.6271*
Q62		−0.5475
Q63	0.6543	
Q64	0.6488	
Q71	0.599	
Q76	0.5052	
Q81	0.759	
Q82	0.5308	
Q83	0.7349	

* Variables retained for multivariate modelling.

survey. Missing national-level data values were imputed using pooled averages of multiple imputation from all available survey data as described by van Buuren.³ Before model fitting, some factors were omitted due to co-linearity of variables, and also to reduce the risk of overfitting the model (see above).

National-level variable selection

As the final data set used in the analysis originated from 15 distinct surveys, effective sample size at the level of a survey is limited, constraining the relative power of the model to detect associations with covariates measured at the level of a survey. Moreover, collinearities between variables are expected to bias the estimation of coefficients due to variance inflation.⁴ To reduce the number of covariates measured on the unit of a survey and to prevent collinearities resulting in biased coefficient estimates, variables were selected using data reduction through multiple factor analysis (MFA).

MFA was used to describe how groups of variables that reflect national-level conditions regarding the TB-HIV burden, substance abuse, socio-economic conditions, TB and HIV knowledge (Figure A.1) are correlated. MFA provides a concise description of how observations vary across different groups, while

Group	Variable code	Variable name
TB stigma		
	Q1	TB stigma proxy: general population recommend non-disclosure
	Q3	TB stigma proxy: women recommend non-disclosure
	Q5	TB stigma proxy: men recommend non-disclosure
Prevalence of TB-HIV epidemic		
	Q18	TB incidence, /100 000
	Q20	New MDR-TB prevalence, %
	Q21	TB-HIV coinfection, /100 000
	Q22	TB-HIV coinfection, %
	Q24	HIV prevalence, %
Substance abuse		
	Q25	Point prevalence (%), drug use disorders, total (15+, 2004)
	Q26	Point prevalence (%), drug use disorders in women, (15+, 2004)
	Q27	Point prevalence (%), drug use disorders in males, (15+, 2004)
	Q28	Age-standardised AUDs (15+), 12-month prevalence total (%) with 95%CI, 2010
	Q29	Age-standardised AUDs in women (15+), 12-month prevalence (%) with 95%CI, 2010
	Q30	Age-standardised AUDs in males(15+), 12-month prevalence (%) with 95%CI, 2010
	Q31	Alcohol dependence (2010), both sexes (%)
	Q32	Alcohol dependence (2010), women (%)
	Q33	Alcohol dependence (2010), men (%)
SES		
	Q35	Prison population rate, 100 000
	Q37	Gini coefficient
Knowledge about TB		
	Q39	Women: 'Heard of TB'
	Q42	Women: knowledge about TB transmission
	Q51	Men: knowledge about TB transmission
	Q60	General population: knowledge about TB cure
	Q61	Women: knowledge about TB cure
	Q62	Men: knowledge about TB cure
Knowledge about HIV		
	Q63	General population: 'Heard of HIV', %
	Q64	Women: 'Heard of AIDS', %
	Q71	Women: HIV stigma score
	Q76	Men: HIV stigma score
	Q81	Women: knowledge about HIV
	Q82	Men: knowledge about HIV
	Q83	General population: knowledge about HIV

Figure A.1 Overview of national-level variables included in the analysis. Colour codes correspond to grouping of variables used in the multiple factor analysis. TB = tuberculosis; HIV = human immunodeficiency virus; MDR-TB = multidrug-resistant TB; AUD = alcohol use disorder; CI = confidence interval; AIDS = acquired immune-deficiency syndrome.

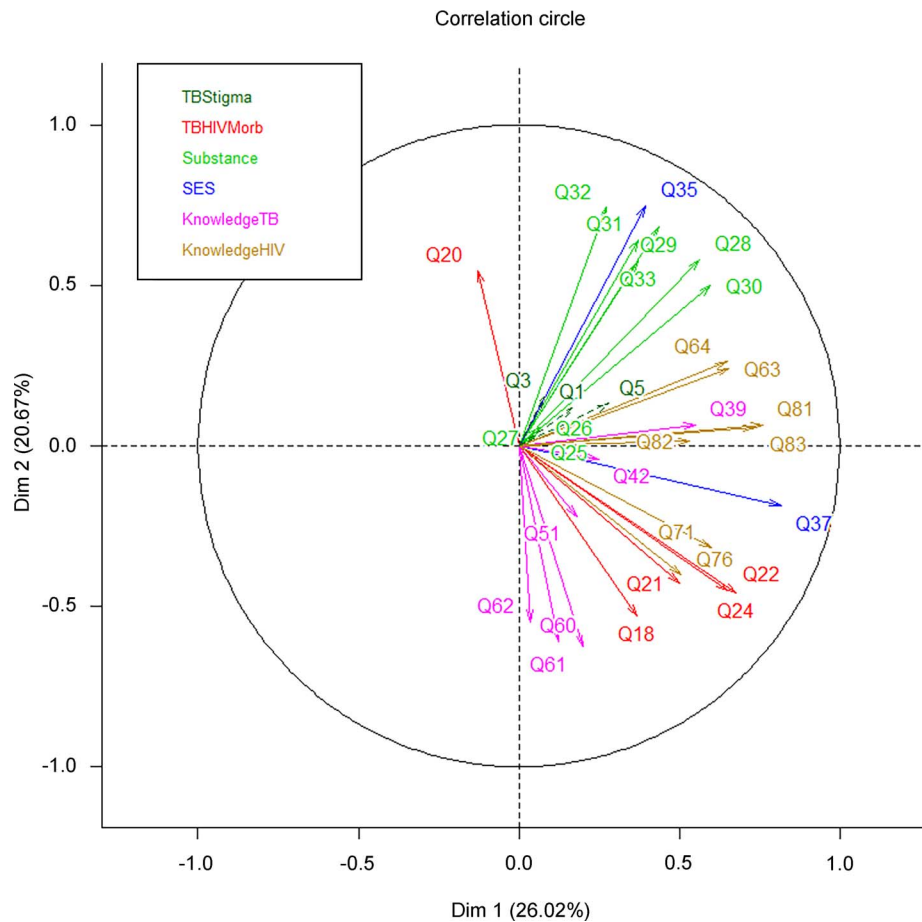


Figure A.2 Factor plot showing the correlations of each of the 32 variables included in the analysis with the first two factors (dimensions, 'Dim 1 & 2') extracted using the multiple factor analysis model (e.g., factors with an eigenvalue of >1 were retained). Variables are colour-coded as follows: dark green = TB courtesy stigma; red = TB-HIV morbidity; light green = substance abuse; blue = SES; pink = TB knowledge; beige = knowledge on HIV. TB = tuberculosis; HIV = human immunodeficiency virus; SES = socio-economic status.

also quantifying relationships between the groups of variables and how these can be used to define latent underlying constructs.⁵ MFA results were used to assess individual observations and groups of variables which are correlated and are likely to reflect latent underlying social, economic or epidemic constructs as identified by the principal factors identified by the MFA model. For convenience, TB courtesy stigma measured as the willingness to disclose the TB status of a family member is also shown in the plot. These data were, however, not included in the MFA analysis.

The results of the MFA are visualised by plotting each of the variables along the first two axes of the MFA (Figure A.2). From Figure A.2, it appears that, as expected, variables correlate strongly within their own groups and therefore along the same axis. The one exception is the group of TB-HIV epidemic conditions (indicated in red) in which the prevalence of new MDR-TB (Q20) seems to correlate less with variables of TB (Q18) and HIV (Q24) prevalence. Variables of HIV stigma and knowledge (Figure A.2,

beige) are widely spread across the first two principle axes of the MFA model. HIV knowledge correlates well with socio-economic status indicators (green) as well as with indicators of substance abuse (Figure A.2, pink). In contrast, variables of HIV stigma correlate more strongly with indicators of TB-HIV morbidity and TB knowledge.

To reduce the total number of variables while retaining conceptual relevance of the model, one variable from each group was selected to be included in the multilevel logistic model (Table A.1). Variables were selected in the following manner: first, all factors with an eigenvalue of >1 were extracted from the model, resulting in two factors. Next, one variable was selected from each group based on the highest correlation to each of the two factors of the MFA (Table A.1). A variable of the HIV knowledge group was omitted as it was found to be highly correlated to HIV prevalence. Finally, TB incidence was still added to the model, as it was understood to be highly relevant for the outcome of interest.

References

- 1 World Health Organization. Global Health Observatory data repository. Global health workforce statistics. Geneva, Switzerland: WHO, 2016.
- 2 World Health Organization. Global tuberculosis report, 2016. WHO/HTM/TB/2016.13. Geneva, Switzerland: WHO, 2016.
- 3 van Buuren S, Groothuis-Oudshoorn K. mice: multivariate imputation by chained equations. *R. J Stat Softw* 2011; 45: 1–67.
- 4 Snijders T A B, Bosker R J. Multilevel analysis: an introduction to basic and advanced multilevel modeling. London, UK: Sage Publications, 2012.
- 5 Abdi H, Valentin D. Multiple factor analysis (MFA). In: Salkind N J. *Encyclopedia of measurement and statistics*. Thousand Oaks, CA, USA: Sage Publications, 2007: pp 657–663.

R É S U M É

CONTEXTE : On pense que la stigmatisation liée à la tuberculose (TB) retarde ou entrave la décision de solliciter des soins de santé, mais la force de cette association et la prévalence de la stigmatisation TB anticipée dans la population générale est inconnue dans la majorité des pays.

OBJECTIF : Examiner les facteurs épidémiologiques, culturels et sociodémographiques associés à la stigmatisation TB dans 15 enquêtes à travers 13 pays et leur lien avec la recherche de soins en cas de toux chez des enfants âgés de <5 ans.

SCHEMA : Une enquête à multiples niveaux par un modèle de régression logistique pondérée a été utilisée pour analyser la manière dont les caractéristiques individuelles et le contexte social affectent la survenue de la stigmatisation TB. La même approche de modélisation a été utilisée pour analyser les associations entre la stigmatisation TB et les facteurs de prédiction individuels de comportement de recherche de soins de santé des mères vis-à-vis des enfants qui toussent.

RÉSULTATS : La stigmatisation TB varie considérablement d'un pays à l'autre. La stigmatisation TB a été négativement corrélée avec le fait de savoir que la TB est curable (OR ajusté [ORa] 0,82 ; IC95% 0,78–0,86) et avec les attitudes d'acceptation du virus de l'immunodéficience humaine (VIH) (indicateur de stigmatisation de la TB) (ORa 0,15 ; IC95% 0,15–0,16). Le comportement de recherche de soins de santé des mères dont les enfants âgés de <5 ans ont une toux a été trouvé positivement corrélé aux attitudes d'acceptation du VIH (OR 1,16 ; IC95% 1,08–1,25), mais n'a été que marginalement affecté par la stigmatisation TB (OR 0,99 ; IC95% 0,98–1,00).

CONCLUSION : Faire connaître l'efficacité du traitement de la TB dans la population va contribuer à diminuer la stigmatisation TB et devrait être prioritaire par rapport à la connaissance du mode de transmission. Les efforts visant à réduire la stigmatisation relative au VIH et à la TB pourrait augmenter la demande de soins pour les enfants ayant des symptômes de TB.

R E S U M E N

MARCO DE REFERENCIA: Se piensa que la estigmatización relacionada con la tuberculosis (TB) retrasa o impide la decisión de buscar atención de salud; sin embargo, se desconoce la fuerza de esta asociación y la prevalencia de estigmas anticipados relacionados con la TB en la población general de la mayoría de los países. **OBJETIVO:** Examinar los factores epidemiológicos, culturales y sociodemográficos asociados con el estigma de cortesía (o estigma por asociación) relacionado con la TB en 15 encuestas realizadas en 13 países y analizar su relación con la búsqueda de atención de salud por parte de las madres de niños de edad de <5 años que presentan tos.

MÉTODO: Se utilizó un modelo multinivel de regresión logística ponderada con el objeto de analizar de qué manera las características individuales y los contextos sociales influyen en la aparición de los estigmas de cortesía. Se aplicó la misma estrategia de modelización, en el análisis de las asociaciones entre los estigmas de cortesía y los factores pronósticos del comportamiento individual de búsqueda de atención de salud por parte de las madres de niños con tos.

RESULTADOS: Se observó una gran variabilidad de los estigmas de cortesía relacionados con la TB en los diferentes países. Estos estigmas exhibieron una

correlación negativa con los conocimientos sobre la posibilidad de curación de la enfermedad (OR ajustado [ORa] 0,82; IC95% 0,78–0,86) y con las actitudes de aceptación de las personas aquejadas de infección por el virus de la inmunodeficiencia humana (VIH; indicador indirecto de estigmatización por el VIH) (aOR 0,15; IC95% 0,15–0,16). El comportamiento de las madres de búsqueda de atención para sus hijos de edad de <5 años con tos exhibió una correlación positiva con las actitudes de aceptación hacia las personas con infección por el VIH (OR 1,16; IC95% 1,08–1,25), pero se modificó poco por el estigma de cortesía asociado con la TB (OR: 0,99; IC95% 0,98–1,00).

CONCLUSIÓN: El hecho de mejorar la percepción general sobre la eficacia del tratamiento antituberculoso contribuirá a disminuir los estigmas de cortesía relacionados con la TB; por lo tanto, se debe atribuir mayor prioridad a este aspecto que a la difusión de los conocimientos sobre los modos de transmisión. Los esfuerzos encaminados a disminuir la estigmatización relacionada con la infección por el VIH y la TB pueden estimular la búsqueda de atención de salud antes la aparición de síntomas de TB en los niños.